DEPARTMENT CIRCULAR

DEQ-12B

Nutrient Standards Variances

~~JUNE 2017~~MAY 2018 EDITION

GENERAL INTRODUCTION

This circular (DEQ-12B) contains information about variances from the base numeric nutrient standards. This information includes details on effluent treatment requirements associated with general nutrient standards variances, as well as effluent treatment requirements for individual nutrient standards variances and to whom they apply.

Circular DEQ-12A contains the base numeric nutrient standards, where the standards apply, and their period of application. Circular DEQ-12A is in a separate document also available from the Department. Circular DEQ-12A is adopted by the Board of Environmental Review under its rulemaking authority in §75-5-301(2), MCA. Unlike DEQ-12A, DEQ-12B (this circular) is not adopted by the Board of Environmental Review. DEQ-12B is adopted by the Department following its formal rulemaking process, pursuant to §75-5-313, MCA.

The Department has reviewed a considerable amount of scientific literature and has carried out scientific research on its own in order to derive the base numeric nutrient standards (see References in DEQ-12A). Because many of the base numeric nutrient standards are stringent and may be difficult for MPDES permit holders to meet in the short term, Montana's Legislature adopted laws (e.g., §75-5-313, MCA) allowing for the achievement of the standards over time via the variance procedures found here in Circular DEQ-12B. This approach should allow time for nitrogen and phosphorus removal technologies to improve and become less costly, and to allow time for nonpoint sources of nitrogen and phosphorus pollution to be better addressed.

Circular DEQ-12B

~~JUNE 2017~~MAY 2018 EDITION

1.0 Introduction

Elements comprising Circular DEQ-12B are found below. These elements are adopted by the Department following the Department's formal rulemaking process. Montana state law (§75-5-103 (22), MCA and 75-5-313, MCA) allows for variances from the base numeric nutrient standards (found in Circular DEQ-12A) based on a determination that the base numeric nutrient standards cannot be achieved because of economic impacts, ~~+~~the limits of technology, or both.

1.1 Definitions

1. **Monthly average** means the sum of the daily discharge values during the period in which the base numeric nutrient standard applies divided by the number of days in the sample. See also, "*Technical Support Document for Water Quality-based Toxics Control*," Document No. EPA/505/2-90-001, United States Environmental Protection Agency, 1991.
2. **Pollutant minimization program** means a structured set of activities to improve processes and pollutant controls that will prevent and reduce nutrient loadings.

2.0 General Nutrient Standards Variances

The general variance treatment requirements in **Table 12B-1** (below) apply to permittees where the Department has demonstrated that immediate compliance with the base numeric nutrient standards, where applicable, would result in substantial and widespread economic impacts. A list of permittees likely to need a general variance is maintained on the Department's website on the Water Quality Standards webpage. The requirements in **Table 12B-1** represent the highest attainable condition treatment requirements and must be reviewed by the Department before July 1, 2020. The Department will process the general variance request through the discharge permit and include information on the period of the variance and the interim requirements. A person may apply for a general variance for either total phosphorus (TP) or total nitrogen (TN), or both. §75-5-313(8), MCA, authorizes the general variance for a period not to exceed 20 years. Through the permitting process and the specific details of each facility, the time required must be as short as possible to meet the highest attainable condition (HAC). A compliance schedule to meet the treatment requirements shown in **Table 12B-1** may also be granted on a case-by-case basis. The final permit limit must be expressed as a load only, and when developing monthly average permit limits for general variances for the ≥1MGD and <1MGD discharge categories, a coefficient of variation (CV) of 0.6 may be used to determine the Table 5-2 multiplier. Table 5-2 is a component of the permit calculation process and is found in the *Technical Support Document for Water Quality-based Toxics Control* (U.S. EPA, 1991) which is cited in Endnote 1.

Cases will arise in which a permittee is or has been discharging effluent with nitrogen and/or phosphorus concentrations lower than (i.e., better than) the minimum requirements of a general variance found in **Table 12B-1**, but the resulting concentrations at the edge of the mixing zone still exceed the base numeric nutrient standards. Such permitted discharges are within the scope of the general variance.

For permittees whose effluent concentrations were, before July 1, 2017, lower than the concentrations in **Table 12B-1**, the general variance must be based on the actual total N and/or total P concentrations of their effluent. The Department will determine if a permittee's actual effluent concentrations are lower than those in **Table 12B-1** by calculating the 95th percentile of representative monthly average effluent concentration data and comparing the result to the applicable values in **Table 12B-1**. For permittees who, after July 1, 2017, attain or do better than the **Table 12B-1** values, the **Table 12B-1** values must be used to establish the permit limit, unless and until the Department revises **Table 12B-1** to reflect a HAC treatment requirement that results from the triennial review.

In a permitted discharge, the interim limits provided for under a variance apply, even if such limits differ from those that might otherwise apply based on a wasteload allocation derived in a Total Maximum Daily Load (TMDL). The interim limits apply during the time period over which the variance is applicable.

Table 12B-1. General variance end-of-pipe treatment requirements.

	Monthly Average	
Discharger Category[2]	**Total P (µg/L)**	**Total N (µg/L)**
≥ 1.0 million gallons per day[3,4]	300	6,000
< 1.0 million gallons per day[3,4]	1,000	10,000
Lagoons not designed to actively remove nutrients	Maintain long-term average[5] and implement the PMP	Maintain long-term average[5] and implement the PMP

[2] See Endnote 2
[3] See Endnote 3
[4] See Endnote 4
[5] See Endnote 5

Sections 75-5-313(7) and (8), MCA, require the Department to review the general variance treatment requirements every three years to assure that the justification for their adoption remains valid. The purpose of the review is to determine whether there is new information that supports modifying (e.g., revising the interim effluent treatment requirements) or terminating the variance. The review must occur triennially and must be carried out at a state-wide scale, i.e., the Department will consider the aggregate economic impact to dischargers within a category (the ≥1 MGD category, for example). The Department, in consultation with the Nutrient Work Group, must consider whether a pollutant control

technology for treating nitrogen and phosphorus is (1) now feasible to attain (i.e., the cost of such pollutant control technology shall not cause substantial and widespread social and economic impacts) using all existing and readily available information, and (2) would result in a more stringent treatment requirements than the requirements in **Table 12B-1**. The Department shall initiate rulemaking to adopt general variance treatment requirements that reflect any proposed changes to the HAC treatment requirements consistent with this review, and revised effluent limits must be included with the permit during the next permit cycle, unless the demonstrations discussed in **Section 3.0** below are made. A compliance schedule may also be granted to provide time to achieve compliance with revised effluent limits.

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Based on the triennial review, the Department shall issue a solicitation for public comment on the nutrient concentrations and conditions associated with the general variance. This solicitation must be conducted through: (1) a rulemaking if changes to the general variance are proposed; or (2) a request for public comment if no changes to the general variance are proposed. (If the Department fails to conduct the triennial review as specified at Section 75-5-313(8), MCA, or if the results of the triennial review are not submitted to EPA within 30 days of the completion of the review, the variance will not be applicable for purposes of the Federal Clean Water Act until such time as the review is completed and submitted to EPA.)

2.1 Time to Achieve the Treatment Requirements in Table 12B-1

Through the MPDES permitting process for each facility, the Department shall establish the time necessary to meet the treatment requirements in **Table 12B-1.** The time for the general variance must only be as long as necessary to meet the treatment requirements in **Table 12B-1**, but could take up to 17 years from the date of approval of the general variances in this circular. The Department has identified up to nine steps for facilities in the ≥1MGD and <1MGD discharge categories to achieve the **Table 12B-1** treatment requirements. These steps are shown in **Table 12B-2**. The steps are a combination of advanced operational strategies using existing facility infrastructure and capital improvements; approximate times (in years) for each step are shown. If a facility were to achieve the **Table 12B-1** treatment requirements using a subset of the steps in **Table 12B-2**, the Department would expect the discharger to need less time to complete that subset of steps. The purpose of **Table 12B-2** is to provide an outline of potential steps needed to achieve the **Table 12B-1** treatment requirements. The actual time period for individual steps may vary between each facility; however, the total time necessary to meet the treatment requirements in **Table 12B-1** may not exceed the remaining variance period.

For the lagoon discharge category, the Department and permittee shall complete the pollutant minimization program requirements described in **Section 2.2** and **Section 2.2.1.2** no later than July 1, 2027.

Table 12B-2. Steps and approximate times for permittees in the ≥1MGD and <1MGD discharge categories to achieve the treatment requirements in Table 12B-1.

Description of Step	Approximate Time to Complete Step (years)
1. Implementation of advanced operational strategies to reduce nutrients using existing infrastructure. Evaluate effects of operational changes and fine tune as necessary. Operations staff identify potential minor capital improvements, if any, that could be made to further advance operational strategies. Preliminarily assess the feasibility of trading, reuse, etc.	**2**
2. If **Table 12B-1** treatment requirements are not achieved, hire an engineer to prepare a preliminary engineering report (PER) that evaluates options for minor and/or major facility improvements, trading or reuse that lead to further nutrient reductions that build upon developed operational strategies, if appropriate. Continue to fine-tune operational strategies. Begin discussion with funding agencies and submit PERs to those agencies, if necessary (for major upgrades).	**1**
3. Go through funding agency timelines and requirements for planning, if necessary. This may involve legislative approval, depending upon the funding sought. Implement minor facility improvements, if appropriate, and fine tune operations for further TN and TP reductions.	**2**
4. Design major capital improvements. Go through the Department (DEQ) and other funding agency review and approval processes for the design/bidding phase, including MEPA analysis, adjustments of rates and charges, legal opinions, etc. Bid major capital project.	**2**
5. Construct major capital project, including trading and/or reuse, if appropriate. Begin operating new infrastructure and fine tune~~ing~~ operations. Continue with advanced operational training with new infrastructure. Evaluate nutrient reductions achieved with major capital project and operator optimization.	**4**
6. If **Table 12B-1** treatment requirements are still not achieved, hire engineer to evaluate alternatives in a PER for next steps to meet **Table 12B-1** treatment requirements for TN and TP.	**1**
7. Submit PER to funding agencies for review, approval, MEPA, etc. Legislative approval required? Obtain funding.	**2**
8. Design and bid capital project to meet **Table 12B-1** treatment requirements ~~-~~for TN and TP.	**1**
9. Construct capital upgrades, including trading, reuse, etc., if appropriate. Continue with operational optimization to meet **Table 12B-1** treatment requirements.	**2**

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2.2 Wastewater Facility Optimization Study: Pollutant Minimization Program

Upon achieving a discharge that meets the requirements of **Table 12B-1**, a permittee shall evaluate current facility operations and develop discharger-specific pollutant minimization activities and implement the pollutant minimization program. Permittees shall consider a full array of reasonable options including, but not limited to, facility advanced operational strategies, reuse, recharge, and land application.

2.2.1 Pollutant Minimization Program: General Requirements

A pollutant minimization program (PMP) is a structured set of activities to improve processes and pollutant controls that will prevent and reduce pollutant loadings. Where no additional feasible pollutant control technology to reduce pollutant loadings can be identified, the highest attainable condition – that is, the general treatment requirements in **Table 12B-1** or the HAC treatment requirements determined for an individual variance (**Section 3.0**) – along with the adoption and implementation of a PMP reflect the greatest pollutant reduction achievable. For either a general or an individual variance, a permittee shall submit a PMP to the Department once the permittee achieves the identified HAC treatment requirements. The Department, following review and approval of the PMP, shall incorporate the PMP into the permittee's next MPDES permit as further set forth in **Sections 2.2.1.1** and **2.2.1.2**. If a permittee achieves the HAC treatment requirement for only one nutrient parameter (i.e., either TN or TP), but not both, then the permittee shall develop and implement a PMP for the achieved nutrient parameter (while continuing to work toward the HAC treatment requirement for the other nutrient parameter).

2.2.1.1. Pollutant Minimization Requirements for Mechanical Plants

Permittees with mechanical treatment systems shall:

- Examine all possible pollutant minimization activities including, but not limited to: documentation, in the Operations and Maintenance Manual, of process control strategies identified and implemented through optimization; ongoing training of operations staff in advanced operational strategies; minor changes to infrastructure to complement and further advance operational strategies; and implementation of pollutant trading and the reuse of effluent if feasible.
- During the permit application and review process, a permittee shall submit a report to the Department describing the activities examined; and a list of the activities the permittee proposes to implement, along with an implementation schedule and rationale for selecting the activities and the time required. After review and approval of the PMP activities, the Department will, as provided in subchapter 13, incorporate the PMP and associated schedule into the permittee's MPDES permit.

2.2.1.2. Pollutant Minimization Requirements for Wastewater Lagoons

For lagoons, the Department and the permittees shall implement the PMP described below to examine potential treatment technologies. Permittees shall implement specific PMP activities identified through the examination of pollutant control technologies.

Requirements of the Department's PMP include:

- Implementing pilot studies before the 2020 triennial review to examine the use of novel, low-maintenance technologies to reduce nutrient concentrations in lagoon system effluent. Based on final results from these studies, the Department shall publish results demonstrating the efficiency of the tested technologies in reducing nutrients in lagoon systems.
- Conducting and completing a statewide review of lagoon performance by 2022 to evaluate effective operational methods and identify those lagoons that require additional improvements. For each facility, within 1 year of completing the review of operational methods, the Department shall begin requiring implementation of the improvements at those facilities that do not require substantial investment or additional study.
- Evaluating the facility-specific recommendations and documentation submitted by each lagoon permittee as part of its optimization activities. The Department and the permittee shall also evaluate the capability of each discharger to implement feasible nutrient reduction strategies.

Permittees that receive a general variance shall:

- Provide sufficient information to allow the Department to evaluate the performance of all PMP activities. Feasible activities will, as provided in subchapter 13, be incorporated into each discharger's PMP through the renewal process for each facility's MPDES permit.

3.0 Individual Nutrient Standards Variances

~~The following~~This section~~s~~ describe~~s~~ ~~(1)~~ the basis for an individual nutrient standards variance ("individual variance")~~, and (2) an alternate method for deriving appropriate interim effluent limits for an individual discharger~~. ~~For both of these types of individual variances, t~~The final permit limit for an individual variance will be expressed as a load only, and when developing monthly average permit limits for individual variances for the ≥1MGD and <1MGD discharge categories, a coefficient of variation (CV) of 0.6 may be used to determine the Table 5-2 multiplier. Table 5-2 is a component of the permit calculation process and is found in the *Technical Support Document for Water Quality-based Toxics Control* (U.S. EPA, 1991) which is cited in Endnote 1.

~~3.1 Individual Variance Based on Substantial and Widespread Economic Impacts~~

Montana law allows for the granting of nutrient standards variances based on the particular economic and financial situation of a permittee (§75-5-313(1), MCA). Individual variances may be granted on a

case-by-case basis because the attainment of the base numeric nutrient standards is precluded due to economic impacts, limits of technology, or both. Individual variances discussed in this section are generally intended for permittees who would have financial difficulties meeting the general variance treatment requirements and are seeking individual nitrogen and phosphorus permit limits tailored to their specific economic situation.

Like the general variance in **Section 2.0**, Section 75-5-313(8), MCA, authorizes individual variances for a period not to exceed 20 years, and each must be reviewed by the Department every three years to ensure that the justification remains valid. Unlike the general variances discussed in **Section 2.0**, the Department may only grant an individual variance to a permittee after the permittee has made a demonstration to the Department that meeting the underlying standards in Circular DEQ-12A would require water quality-based controls that result in substantial and widespread economic and social ~~and economic~~ impacts. ~~The variance must identify the lowest (i.e., best) effluent concentration that is feasible based on achieving the highest attainable condition (HAC).~~ A permittee, as part of this assessment process, must also demonstrate to the Department that there are no reasonable alternatives including, but not limited to, trading, compliance schedules, reuse, recharge, and land application that would allow compliance with the base numeric nutrient standards. If no reasonable alternatives exist, then an individual variance ~~is~~ may be justifiable ~~and becomes effective and may be incorporated into a permit following the Department's formal rulemaking process~~. ~~At the time that the facility achieves its HAC treatment requirements, the permittee shall submit a pollution minimization program (PMP) to the Department (see details on PMPs in **Section 2.2**).~~ Like any variance, individual variances must be adopted as revisions to Montana's water quality standards and submitted to EPA for approval. Individual variances the Department adopts ~~in the future~~ must be documented in **Table 12B-3** below.

The variance must include a highest attainable condition (HAC) expressed using one of the following options:

1. The highest attainable condition that reflects the greatest pollutant reduction achievable (i.e., best treatment requirements[6] that are feasible) based on the economic and social impact evaluation completed for the facility. Water quality computer modeling may also be used to determine the greatest pollutant reduction achievable when articulating the treatment requirements, per ARM 17.30.660(4).

2. If no additional feasible pollutant control technologies beyond what is already installed can be identified, the highest attainable condition is the treatment requirement reflecting the greatest pollutant reduction achievable and adoption and implementation of a pollutant minimization program (PMP).

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[6] See Endnote 6.

The variance must identify and adopt the highest attainable condition that applies to the permittee and identify the term of the variance. The time for the individual variance must only be as long as necessary to meet the highest attainable condition.

Since the basis of ~~this type~~an of individual variance is related to the economic status of a community or permittee, or to the limits of technology, ~~at each triennial review~~ when the Department carries out its review every three years ~~the Department~~it shall consider if the basic economic status of that community or permittee, or the limits of technology, has ~~substantially~~ changed. The same parameters used to justify the original individual variance must be considered. If, for example, new, low-cost nutrient removal technologies have become feasible, or if the economic status of the community or permittee has sharply improved, the ~~treatment requirement component~~HAC of the variance may no longer be justified. When the review of any individual variance longer than five years identifies that a more stringent ~~highest attainable condition~~HAC is feasible to attain, the Department shall revise the individual variance to reflect the new, more stringent ~~highest attainable condition~~HAC consistent with the Department's reevaluation schedule specified for the individual variance in **Table 12B-3**.

Alternatively, the Department may ~~or~~ pursue other options such as a permit compliance schedule, trading, reuse, recharge, land application, or a general variance.

Based on the triennial review, the Department shall issue a solicitation for public comment on individual variances. This solicitation must be conducted through: (1) a rulemaking if changes to an individual variance are proposed; or (2) a request for public comment if no changes to an individual variance are proposed. (If the Department fails to conduct the triennial review as specified at Section 75-5-313(8), MCA, or if the results of the triennial review are not submitted to EPA within 30 days of the completion of the review, the variance will not be applicable for purposes of the Federal Clean Water Act until the review is completed and submitted to EPA.)

~~3.2 Individual Variance Effluent Limits Based on Site-specific Water Quality Modeling~~

~~Generally, the interim effluent limits in any variance, general or individual, will be based on achieving the highest attainable condition within the receiving water. In some cases a permittee may be able to demonstrate, using water quality modeling and reach-specific data, that greater emphasis on reducing one nutrient (target nutrient) will achieve the highest attainable condition, since it would produce comparable water quality and biological conditions in the receiving water as could be achieved by emphasizing the equal reduction of both nutrients (i.e., both nitrogen and phosphorus). Requiring such a permittee to immediately install sophisticated nutrient removal technologies to reduce the non-target nutrient to levels in **Table 12B-1** may not be the most prudent nutrient control expenditure, and could cause the discharger to incur unnecessary economic expense. In such a case, the interim effluent limits for the individual discharger may be adjusted to reflect greater emphasis on controlling one of the parameters, so long as the highest attainable condition is maintained within the receiving water. The permittee will be required to submit the demonstration with the proposed interim effluent limits to the Department for review and will be required to provide monitoring water quality data that can be used~~

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~~to determine if the justifications for the interim effluent limits continue to hold true (i.e., status monitoring). Because status can change, for example due to substantive nonpoint source cleanups upstream of the discharger, status monitoring by the discharger is required. The Department shall review the basis of model-based variances triennially. At the time that the receiving waterbody achieves the highest attainable condition, the permittee must submit a pollutant minimization program (PMP) to the Department (see details on PMPs in **Section 2.2**).~~

~~Based on the triennial review, the Department shall issue a solicitation for public comment on individual variances. This solicitation must be conducted through: (1) a rulemaking if changes to an individual variance are proposed; or (2) a request for public comment if no changes to an individual variance are proposed. (If the Department fails to conduct the triennial review as specified at Section 75-5-313(8), MCA, or if the results of the triennial review are not submitted to EPA within 30 days of the completion of the review, the variance will not be applicable for purposes of the Federal Clean Water Act until the review is completed and submitted to EPA.)~~

~~The nutrient concentrations identified via this modeling may eventually be adopted as site-specific standards under the Board of Environmental Review's rulemaking authority in §75-5-301(2), MCA, but would require an analysis of their downstream effects prior to adoption.~~

Table 12B-3. Table for individual variances that may be adopted.

MPDES Number	Facility Name	Discharge Latitude	Discharge Longitude	Receiving Waterbody	Receiving Waterbody Classification	Monthly Average Total P (µg/L)	Monthly Average Total N (µg/L)	Start Date	Sunset Date (maximum)	Review Schedule (year)	Review Outcome

Table 12B-3. Individual nutrient standards variances.

MPDES Number	Facility Name	Discharge Latitude	Discharge Longitude	Receiving Waterbody	Receiving Waterbody Classification	Monthly Average Total P (mg/L)	Monthly Average Total N (mg/L)	CV	Start Date	Sunset Date (maximum)	Review Schedule* (year)	Review Outcome
MT0020184	City of Whitefish	48.39194	-114.3299	Whitefish River	B-2	1.0	10.0	0.6	8/1/2022	8/1/2029	2025	

*For individual variances longer than five years, the Department must complete the reevaluation, which includes both the review and any necessary rulemaking, no less frequently than every five years from the date of EPA approval.

4.0 Endnotes

(1) United States Environmental Protection Agency. 1991. *Technical Support Document for Water Quality-based Toxics Control.* EPA/505/2-90-001, PB91-127415. Office of Water, Washington, D.C. March 1991.

(2) Based on facility design flow.

(3) Facilities that are already meeting the treatment requirements for one or both nutrients in **Table 12B-1** must continue to meet these levels and are required to implement the pollutant minimization program in **Section 2.2** of this Circular.

(4) If the Department believes that a non-POTW permittee can achieve a treatment level better than (i.e., at a lower concentration than) the general variance requirements in **Table 12B-1**, then the permittee and the Department shall discuss what treatment level can be achieved and the Department, in consultation with the permittee, will identify the highest attainable condition and level of treatment.

(5) For lagoons, the long term average is calculated as the arithmetic average of representative facility data from the past 3 years, or up to the past 5 years if those data are also representative.

(6) HAC treatment requirements are equivalent to the interim effluent condition found at 40 CFR 131.14(b)(1)(ii)(A)(2).